

# **Disordered Eating Among High School Athletes**

Undergraduate Research Thesis

School of Allied Medical Professions

The Ohio State University

March 2, 2010

Lydia Kern

Health Sciences (Health and Wellness)

Research Thesis Advisory Committee:

Jill Clutter, PhD, CHES

Christopher Taylor, PhD, RD, LD

## **Abstract**

### **Objectives**

The purpose of *Disordered Eating Habits Among High School Athletes* was to determine if high school athletes report participating in pathogenic weight control methods at a higher percent rate than non athletes. Information regarding the weight management intentions and behaviors of both athletes and non athletes were analyzed utilizing data obtained from the Youth Risk Behavior Survey and include exercise, calorie intake, fasting, self-induced vomiting, and diet supplement use. Accurate or inaccurate body perception of those individuals who participated was compared using Body Mass Index calculations versus perceived body weight categorization. These were investigated with the intention of determining unhealthy behavior patterns in both athletes and non athletes in order to determine if athletic participation influences behaviors or increase the usage rate. The behaviors and intentions of males and females are also compared to be able to better understand any potential differences in reported behaviors based on gender. Finally, responses indicating mental status are analyzed to determine if athletic participation influences rates of depression or disordered eating patterns. This research was driven by the desire to determine if high school athletes are at a greater risk for developing eating disorders in order to be able to recognize risk factors and develop early intervention programs for a specific target population.

### **Methods**

This study is a retrospective cross-sectional design and data files were downloaded through the Center for Disease Control's website and were analyzed using the Statistical Package for Social Sciences (SPSS 17.0) for complex samples. The data came from a population sample that participated in the 2007 Youth Risk Behavior Survey and was weighted to ensure no over or underrepresentation of specific populations.

### **Results**

It was found that athletes do report that they are attempting to either maintain weight or gain weight more often than non athletes; however, they do not report trying to lose weight at a higher rate. Exercising to lose weight or maintain weight was the only weight management technique reported as being used more often by athletes versus non athletes. Non athletes that are either underweight or of normal weight have an inaccurate body perception more often than athletes who are underweight or normal weight. However, athletes who are overweight or obese have higher percentages of inaccurate body perception than non athletes who are overweight or obese. Athletes have a lower percentage of BMI classification of being underweight than non athletes. Female athletes reported utilizing all of the weight management techniques more often than male athletes. Non athletes reported both feelings of hopelessness and suicide consideration more often than athletes and of those athletes that did report these mental disturbances, they only reported using exercise as a weight management technique more often than the non athletes.

### **Conclusions**

The results of this study indicate that athletic participation does not increase the tendencies toward disordered eating habits. Although certain percentages of athletes do report utilizing the more extreme weight management techniques, they are less than those percentages of non athletes and their results follow the same patterns and trends. Athletes tend to have a higher accuracy of body perception and a higher percentage of them are classified as having a normal body weight. Male and female athletes report utilizing different weight management intentions and behaviors which could both be considered unhealthy disordered eating habits in different forms. Although there are indications of potential eating disorders among athletes, it seems more likely that the age range of the participants rather than athletic participation influenced these behaviors. It would be beneficial for future studies to separate the athletes according to sport, gender, and/or level of participation to gain a better understanding of how athletes are affected by disordered eating habits.

## **Table of Contents**

Cover Page-----	1
Abstract-----	2
Table of Contents-----	3
Chapter 1: Introduction-----	4
Problem Statement-----	4
Review of Literature-----	5
Objectives-----	15
Chapter 2: Methodology-----	17
Population and Sample-----	17
Design-----	17
Data and Instrumentation-----	17
Chapter 3: Results-----	19
Results-----	19
Discussion-----	25
Limitations-----	30
Application to Practice-----	31
Conclusion-----	32
References-----	33

## CHAPTER 1

### INTRODUCTION

#### *Problem Statement*

The Center for Disease Control reported that in 2007, 45.2% of adolescents ranging from ninth to tenth grade were trying to lose weight. They went on to further reveal that 15.8% of students practiced a pathogenic behavior to aid in losing weight or prevent further weight gain. These behaviors included any combination of not eating for twenty-four or more hours; taking diet pills, liquids, or powders; self-induced vomiting; or excessively using laxatives<sup>1</sup>. In both males and females, this trend of being overly preoccupied with losing weight or preventing weight gain has been on the rise over the past ten years and is predicted to continue increasing. Although it is generally assumed and commonly indicated through research that females are affected more often by these ideals and practices, it has recently been shown that males are becoming more and more concerned with their weight and taking unhealthy steps to control it<sup>2</sup>.

The National Eating Disorder Association has stated that currently ten million females and one million males are fighting a life and death battle with a diagnosed eating disorder<sup>3</sup>. This does not include those cases that are not reported because of the secretiveness, shame, and stigma surrounding eating disorders. It has been reported that over 80% of American women alone are dissatisfied with their body<sup>3</sup>. The magnitude of eating disorders and how widespread it could become can only be imagined when taking into account those individuals who suffer from body dissatisfaction, sub clinical disordered eating attitudes and behaviors, and are left undiagnosed. However, it is possible to try and prevent these disorders using developed strategies that could target specific populations and address known facts and statistics, such as the finding that 40% of newly identified cases are in adolescent females between the ages of fifteen and nineteen<sup>3</sup>. With some populations being affected to a greater degree than others, it is important to first consider all environments that could foster the onset of an eating disorder and then focus on those settings that could have the greatest impact on the most susceptible individuals. This approach supports further research into potential populations that would allow for the identification of those that are

at risk. There also needs to be an understanding of what situations and characteristics could put an individual at risk.

The following study dealt with the prevalence of disordered eating behaviors among high school athletes. Not only have adolescents been identified as a high risk population, but the addition of athletic participation has been debated as to whether or not it furthers the susceptibility of high school students. This is due to its' competitive nature and focus on performance enhancement through the potential encouraging of weight management and a desired sport-specific physique. Adolescent and early adulthood years have been identified as the most common stages in life for the onset of eating disorders to occur. Puberty and the quick and sometimes dramatic changes in body weight and shape that accompany it significantly affect the attitudes that teenagers have towards their body. These changes have an even greater impact on athletes if they feel that their athletic performance may be compromised as a result, especially if they are involved in elite athletic participation and competition that typically takes place in this age range<sup>5</sup>. The issue being addressed is whether or not athletes have a higher rate of disordered eating habits which could result in the development of an eating disorder. This national concern affects the future health of the nation due to life-long health issues that surround eating disorders. Gaining a better understanding of specific populations that are more susceptible which can be targeted for prevention purposes is the main motivator for furthering research in this area.

### ***Review of Literature***

In a time where overweight and obesity issues are increasing and continuously discussed as a very prevalent health concern that results in a multitude of disease complications, it is important to realize that proper weight management is crucial to individuals and society as a whole. Not only can obesity lead to other health problems, but it increases the amount of money spent on health care. Healthy eating habits and physical activity are important for preventing obesity as well as other diseases<sup>1</sup>. However, it is also detrimental when weight management is taken to the extreme and the positive health effects of diet and exercise are negated by harmful short and long term health consequences resulting from caloric intake restriction or excessive expenditure. There are different physical and mental health concerns associated

with the onset and continuation of eating disorders. Anorexia nervosa is a self starvation method that prevents the body from functioning properly due to a lack of essential nutrients<sup>3</sup>. With a significantly decreased caloric intake the body tries to conserve energy by slowing down basic processing anywhere possible. This can result in an abnormally low heart rate and blood pressure which leads to physical changes in the heart muscles and increases an individual's risk for heart failure. In an effort to keep the body warm, a layer of hair referred to as "lanugo" will begin to cover the skin surface. Additionally there can be muscle loss and weakness associated with chronic fatigue and possible fainting. Dehydration that is common with anorexia nervosa can result in dry skin and hair, hair loss, and eventual kidney failure<sup>3</sup>. A decrease in bone density can lead to early onset osteoporosis and oftentimes accompanies a loss in menses for females<sup>4</sup>. When Bulimia nervosa is the eating disorder present, the individual goes through binge eating and purging cycles, which not only affects the digestive system but alters the chemical and electrolyte balance of the body. This imbalance specifically results from the dehydration that occurs and a decrease in potassium, sodium, and chloride. Irregular heartbeats and organ functioning can result and lead to heart failure, peptic ulcers, and pancreatitis. Gastric rupturing can occur during bingeing, while inflammation or rupturing of the esophagus can occur during purging, along with tooth decay and discoloration from the stomach acid<sup>3</sup>. Even with all the potential life threatening complications that can result from eating disorders, most insurance companies do not provide the funding for adequate care. In fact a majority of patients do not receive the treatment necessary and nearly a third never receive any mental assessment or care to help them fight their disease<sup>3</sup>. Additionally a lack of funding for research on proper prevention, detection, and treatment of these diseases prevents furthering the knowledge and understanding of the details surrounding the struggles of individuals suffering from eating disorders. Statistics and trends imply that it is possible for the prevalence of eating disorders to continue to rise, which leads to the encouragement of further investigations on how to prevent and treat these cases. Identifying and targeting at risk populations would allow for the most susceptible people to be reached. Research shows that athletic participation, especially in high school, may increase the risk for adolescents to develop disordered eating behaviors. Attempting to determine whether or not these individuals are

truly more susceptible allows for furthering knowledge about potential interventions and hopeful prevention.

Recognition of the positive impact of athletic participation and its' capability to enrich the high school experience must be made. This study does not seek to discourage the participation in all high school sports; instead simply raise awareness of the potential dangerous and life altering consequences that may accompany youth's participation in such activities. The National Federation of State High School Associations (NFHS) has stated that interscholastic sports "instill a sense of pride in community, teach lifelong lessons of teamwork and self-discipline, and facilitate the physical and emotional development of our nation's youth<sup>6</sup>." In the NFHS' released document, *The Case for High School Activities*, many studies and articles were reviewed that demonstrated the positive impact high school athletics can have on adolescents. It may be a predictor of later success by teaching discipline and the confidence and skills to handle competitive situations. Athletes generally have a higher grade point average and attendance record due to their increase in determination and confidence to be academically successful. This trend of higher academic performance and athletic success can aid in college admission. In general, a decrease in discipline issues, smoking rate, and alcohol/drug use has been seen as well. Additionally, sports inherently increase the physical activity of youth, which improves weight and body mass index measurements. The regular participation in physical activity builds or maintains healthy bones, muscles, and joints by controlling weight, building lean muscle, and reducing fat. This can also help to prevent or delay the onset of different chronic conditions such as high blood pressure. Finally, an increase in self-esteem and reduction in depression and anxiety is generally thought to result from athletic participation<sup>6</sup>. As with anything in moderation, it is likely that athletic participation truly does result in these positive outcomes. However, the debate lies in where the line is drawn between healthy athletic participation and internal and/or external motivators that drive young athletes into a downward spiral of harmful habits that reveal the dangerous and negative impact of such involvement. It is this consequence that needs to be further investigated to determine if steps need to be taken to decrease the disordered eating patterns among young athletes to prevent the development of eating disorders and the health

consequences that will remain long after they have stopped training and competing in their respective sports.

It is thought that participating in competitive sports can lead to eating disorders for a number of reasons. There can be a slew of pressures resting on the shoulders of athletes either driven by internal expectations of themselves or goals set by outside influences, such as coaches, parents, teachers, or even the general community. Our society today encourages an ideal body shape and weight through different sociocultural pressures for both males and females, which are typically even more stressful and stringent for women<sup>5</sup>. Competitive pressures add to these already present pressures and can increase a young athletes risk for developing an eating disorder<sup>7</sup>. Some studies have found that athletes typically exhibit more positive attitudes and behaviors, a higher self- efficacy, and better psychological adjustment and stress management skills to maintain a higher self-esteem and personal well being<sup>7</sup>. However, it is other aspects of an athlete's psyche that get overlooked as a warning sign and instead are usually regarded as positive qualities found in young athletes. The traits could be any combination of perfectionism, being goal-oriented, competitiveness, and an intense concern with personal performance<sup>5</sup>. Patients diagnosed with eating disorders have this same drive for high achievement and strive to be perfect both physically and when completing daily tasks or life changing events. In fact, perfectionism has been singled out and studied repeatedly, seemingly being capable of predicting varying forms of disordered eating<sup>7</sup>. These personality characteristics found in most athletes may increase their risk for developing an eating disorder, especially when they are put in a highly competitive environment or more so in particular sports that are aesthetic or weight based<sup>7</sup>. The level of commitment and competition that an individual is exerting and experiencing can reveal varying results. Even though disordered eating may not affect all athletes, their increased vulnerability to developing one encourages further research and a better understanding in order to better protect and prevent such harmful habits from altering the life of high school athletes.

It is possible for eating disorders to go unnoticed or undiagnosed due to an individual not exhibiting all the usual characteristics or not meeting all the criteria to warrant their placement into a



specific disease category. These types of individuals have been studied and sometimes information can be found that refers to their cases as a subclinical eating disorder or a variation of an established eating disorder. For example, anorexia athletica is connected to an intense fear of gaining weight or “becoming fat” among athletes, even if they are currently below their expected and normal weight range. These undiagnosed cases give insight into the warning signs of potential eating disorders by establishing precursor behaviors that typically lead into a more severe case. This information allows for further research and an appropriate arena for a timely intervention and preventative measures to be taken. In a study done by Katherine Beals and Melinda Manore, eight characteristics of female athletes with subclinical eating disorders were found<sup>8</sup>. These were preoccupation with food, energy intake, and body weight; distorted body image and body weight dissatisfaction; body weight significantly influencing self-evaluation; intensely fearing gaining weight, even if currently underweight; using pathogenic weight control methods to lose weight; following strict dietary rules for food intake, accompanied by guilt and self-hatred if broken; absence of another medical condition to explain restrictive diet or low body weight; and/or menstrual dysfunction<sup>8</sup>. Increasing the awareness of these characteristics can allow for those around an undiagnosed individual to identify their disordered eating patterns quicker. This could potentially prevent the further development of a serious eating disorder because it has been shown that many cases of anorexia nervosa and bulimia nervosa began as a subclinical variation. It is also important to recognize that the rate of recovery has been linked to the severity of the eating disorder when diagnosed, which means that an earlier detection of the disease could lead to a more successful recovery<sup>8</sup>. When diagnosing eating disorders, the focus can oftentimes become centered on certain weight measurements. However, demonstrating body image disturbances and pathological weight control behaviors should also be considered a significant indication that treatment is needed to aid in preventing these mental tendencies and behavioral habits from translating into the physical weight loss measurements. Furthermore, it is common for the weight of an athlete to be higher than expected due to muscle mass weighing more than fat and typically athletes having more muscle fibers. The higher reading on a common scale could potentially mask a lower than normal body fat percentage which can

correlate with unhealthy eating patterns and caloric restriction. The main point is that a scale reading should not be considered the end all indicator of an athlete's potential struggle with energy balance. The typical cutoff for diagnosing potential anorexia cases is a BMI of 17.5 and one study found that no athletes were significantly lower than this; however, they were functioning at a much lower energy deficiency and they showed subclinical signs of eating pattern and body image disturbances<sup>8</sup>. This signifies that a low body weight can be important in diagnosing patients, but the magnitude of energy deficiency that they are operating on should be investigated.

Studies have found varying results on whether or not athletes are at a higher risk of developing an eating disorder. There is an increased pressure to maintain a certain physique for athletes in addition to the already prevalent societal ideal of slimness. A desire to reduce size for competition, certain personality characteristics, and the emphasis on the body all increase an athlete's susceptibility to developing eating disorders. Personality characteristics that are common amongst athletes and individuals with eating disorders can be any combination of competitiveness, perfectionism, compulsiveness, drive, and self motivation. An additional risk factor is the need for athletes to maintain strict control over their body shape because the focus of success in sports can be linked to body composition, appearance, and shape. This can be encouraged through monitored or even unmonitored weigh-ins and the responsibility to achieve and maintain an optimum weight<sup>9</sup>. It is common for athletes to struggle through a misguided attempt to improve their performance and athletic success through excessive dieting and weight loss. Those suffering with subclinical eating disorders might deliberately abstain from certain types and amounts of food and set strict dietary guidelines for themselves that are tightly controlled and regimented. However, the most common pathogenic methods used among athletes with subclinical eating disorders were found to be excessive exercise (beyond those required by their specific sport), fasting and low calorie diets, and diet pills<sup>8</sup>. This same study found that eighty-eight percent of the athletes with subclinical eating disorders considered themselves to be overweight, even if they were normal or underweight and they reported always or often "feeling fat" significantly more than the other participants. The motives behind an individual's weight control and the methods used to

achieve or maintain weight loss can be significant indicators of disturbed eating patterns and potential complications for athletes.

Athletes in some sports seem to be affected by disordered eating patterns more often than others. Sports that encourage leanness or low body weight, such as running, swimming/diving, or gymnastics typically have a higher frequency of eating disorders<sup>5</sup>. Additionally aesthetic sports (cheerleading) can also have higher rates<sup>5</sup>. However, variations in data collection methods exist and can lead to variations in results and prevalence rates. This can explain why some studies find that there are no significant differences between sports<sup>9</sup>. This same result pattern occurs when evaluating whether or not gender is a significant determinant for the development of eating disorders. Even though some studies state the gender is not a crucial variable, it is typically found that the rate is in fact lower amongst male versus female athletes<sup>5</sup>. However, this should not encourage leaving male athletes out of the discussion regarding disordered eating habits and the potential development of eating disorders. In fact it has been found that eating disorders are on the rise for males, especially in sports where being ultra lean offers a competitive advantage. Additionally, recent studies have found a higher incidence rate than literature reports as the prevalence rate signifying underreporting among males. The general regard for eating disorders to be rare in male athletes might need to be reevaluated and it should be taken into consideration that the risk factors and course of the disease might differ between males and females<sup>2</sup>. Female athletes are faced with general societal pressures and sport specific pressures to be thin, whereas males are typically faced with body shape pressures to enhance their athletic performance<sup>5</sup>. Ultra thinness is encouraged for females and muscle mass in males, which results in different types of behaviors and symptoms<sup>9</sup>. The warning signs may vary between genders, making it more difficult to identify disturbed eating patterns. For instance, in one study it was found that males were more likely to discuss binge eating behaviors and the females revealed purging behaviors<sup>2</sup>. Both could indicate disordered eating patterns; however, purging might be considered more indicative of an eating disorder and draw more attention to the females than bingeing would for the males as an abnormal pattern. Subclinical cases are more common than full blown eating disorders for males because they might not exhibit all the typical

clinical aspects of anorexia or bulimia and do not receive treatment. It has also been suggested that disordered eating behaviors among males are justified as a “rational” response to the demands of a sport rather than a manifestation of a psychological disease like they typically would be for females, even if both are partaking in the same acts<sup>2</sup>. It also may take longer to diagnose an eating disorder in males because they can survive on a lower body fat percentage than females (5% versus 12%) before displaying the negative health consequences and for a longer time<sup>2</sup>. When researching the differences in eating disorders for males and females, it might not be the case the one has a higher rate than the other. Instead it might be more beneficial to recognize that eating disorders affect males and females differently and are found in different forms with varying outcomes, making it harder to detect and diagnose them in males.

Besides the previously mentioned health consequences of eating disorders, these behaviors raise additional concerns for athletes and specifically young athletes. Focusing on prevention and detection in young athletes can be really beneficial when considering that not only are teenagers more vulnerable in general, but many college athletes report that their eating disorders and use of pathogenic weight control techniques began at a younger age<sup>9</sup>. Intervention programs at a younger age when the disorder is still in development might result in a better long term outcome for the athlete. Short term effects of the disordered eating habits create additional barriers to success both competitively and in life. Fasting has been found to be the most common technique used among athletes with eating disorders, which proposes a significant issue when athletes are trying to balance between the physical strength and stamina needed for their sport and the debilitating effects of an energy deficiency resulting from disordered eating habits<sup>9</sup>. This malnutrition can inhibit their growth pattern and delay maturity. Additionally, this energy restriction in combination with an athlete’s high level of physical activity increases their risk for chronic fatigue, decreased immune functioning, poor or delayed healing from injury, anemia, electrolyte imbalances, endocrine abnormalities, menstrual dysfunction, and decreased bone density<sup>8</sup>. Adolescence is a critical time for bone acquisition and the positive impact of exercise on bone mass is reversed when eating disorders develop. This is even more of a concern for females with eating disorders because they tend to miss a key developmental period for maximizing their bone mineralization because bone mass is linked to

the presence of menarche, resulting in a multitude of negative long term health consequences. Eating disorders are typically associated with menstrual irregularities or amenorrhea which in turn results in a decrease in bone mass, which is typically studied and referred to as the Female Athlete Triad<sup>4</sup>. Additionally, it has been suggested that males are capable of returning to normal eating habits and increasing their weight quicker than females after ending their athletic career, resulting in less long term effects for males<sup>2</sup>. It is a general belief among young athletes with disordered eating habits that excess weight will hinder their performance; however, it is harder for them to understand that the health consequences associated with their behaviors will result in the eventual barrier to optimal performance. This makes eating disorders among athletes challenging to treat once they are present because athletes fail to recognize or acknowledge that their health is a greater priority than their sport<sup>2</sup>. In addition to the physical consequences of eating disorders among athletes, psychological concerns may present themselves. Body image is composed of perception and satisfaction and has been found to aid in an individual's self esteem<sup>10</sup>. Low self-esteem has been linked to patients with anorexia and bulimia<sup>9</sup>. If athletes are thought to have a higher rate of disordered eating patterns, it might be the case that they also have higher rates of low self esteem, depression, and other mental disturbances. These could be used in research as a potential risk factor, indicator, or consequence depending on the approach and findings.

In a literature review done by Susan Byrne and Neil McLean, suggestions were made that would be beneficial to the development of potential studies. They revealed the need for further investigations into gender differences as well as studies that have large numbers, various types and levels, an appropriate control group, accurate reports from athletes, and measurements of perceived pressures<sup>5</sup>. There is a significant amount bias that can occur along with dishonesty when dealing with the athletes directly or having them complete a survey that is obviously measuring their weight concerns and management behaviors. This study took into account some of these suggestions. By using a national database with the responses to the Youth Risk Behavior Survey it will be possible to include a broad range of students to not only increase the number of participants, but also obtain information from participants from many backgrounds. This survey is not specifically used to diagnose eating disorders and it does not directly ask

for information about potential or current clinical diagnoses. However, it does include questions surrounding pathogenic weight control methods and the frequency of use by the individuals. The results from this survey will allow for warning signs for potential eating disorders to be studied through identifying those participants with current disordered eating habits. Because this survey was not an eating disorder specific test and the students were questioned on a multitude of topics, it is likely that they answered more accurately and were not concerned specifically with the fear of being targeted as an individual with an eating disorder. YRBS was done anonymously, so even though it was self-report, the lack of a name attachment is beneficial in creating more honest reports<sup>5</sup>. This study potentially has the ability to add to the current research by including more student athletes versus non athletes, who differ in ability and commitment level; decreasing potential dishonesty by being retrospective and unobtrusive in nature; including gender comparisons; evaluating body perception versus and actual BMI calculation; and including insight into the depression state of athletes and non athletes with and without disordered eating habits.

When reviewing various literature and available studies, it seems appropriate to continue conducting research that deals with athletes and disordered eating behaviors such as this study for the benefit of young athletes and their health. The effects of eating disorders compromise an individual's health in both the short and long term and recovery becomes a life-long battle. Eating disorders among athletes are intensified when their "careers" end, whether it is before or after college and they are transitioning into normal exercise routines versus the intense training programs they previously were utilizing to prevent weight gain. The internal and external pressures driving these athletes can lead to an intense fear of failure and depression or self-esteem issues if they fail to obtain perfection on or off the field. It is for these reasons that early detection and treatment of pathogenic weight control behaviors should be done in an effort to minimize the number of young athletes who are affected by eating disorders. However, it is first necessary to determine which target populations are most susceptible, so that preventative education can be done in an effort to teach the importance of a proper balance between healthy exercise habits and overdoing it. In the past there has been a focus on college or elite level

athletes, but it is important to recognize that all of these athletes began in high school or even younger. This is where their training habits and dedication to the sport were instilled along with the potential habits believed to increase their chance for success, including weight control methods. This study contributes to the resources available that aid in determining if in fact young athletes are an appropriate target population, which can also lead to a greater support of beneficial interventions. For example, *Improving the Body Image, Eating Attitudes, and Behaviors of Young Male and Female Adolescents*, was a study done that proved that it is possible to lower the drive for thinness, increase body satisfaction, increase physical weight, and decrease weight control methods among at risk students through an interactive school based educational program<sup>11</sup>. Potentially successful interventions raise further support for studies such as this one that aid in identifying target populations that would benefit the most from such programs. Adolescence is a critical time for both physical and mental development and it is important to obtain as much research surrounding disorders and behaviors that may or may not affect that proper growth. High school athletics could potentially be an important and appropriate setting for interventions to prevent the development of eating disorders that are currently affecting a majority of Americans in one way or another<sup>3</sup>.

### ***Objectives***

The purpose of this study is to determine if high school athletes generally have a higher percent rate of practicing pathogenic weight control methods than non athletes. Specifically information on weight management intentions, exercise, caloric intake, fasting, diet pills, and vomiting were able to be obtained from the Youth Risk Behavior Survey (YRBS) in order to determine if athletes participated in these activities more often than non athletes. Additionally, it is possible to determine which methods are most commonly used for the purpose of weight loss among high school students. Gender differences are also able to be investigated with the survey results. Body perception of the participants is compared to an actual calculation of their BMI to determine if athletes are more likely to have an inaccurate mental representation of their body composition in comparison to what would be considered normal. Finally, information on depression/mental disturbances were reviewed in an attempt to determine if there is a

connection between athletes with disordered eating habits and these mental tendencies, or if they differed from non athletes. This research was done with the purpose of investigating whether or not high school athletes are at a greater risk for developing an eating disorder. This will further help to determine which signs to look for and if interventions would be appropriate and beneficial to the majority. The specific research questions are:

1. Is there a difference between disordered eating habits of high school athletes versus non athletes?
  - a. Do athletes report participating in any of the following more often than non athletes to attempt to lose or maintain the same weight?
    - i. Weight management intentions
    - ii. Increasing exercise habits
    - iii. Restricting caloric intake
    - iv. Fast for more than 24 hours
    - v. Take diet pills, powders, or liquids
    - vi. Vomit or take laxatives
  - b. In comparison to their calculated Body Mass Index (BMI), do athletes have an inaccurate body perception more often than non athletes?
  - c. Do athletes have a higher percent of individuals classified as being underweight according to their BMI calculation versus non athletes?
2. Do male or female athletes report utilizing the above weight management techniques more often?
3. Do athletes versus non athletes have a higher depression rate and is this correlated with reported disordered eating behaviors?
  - a. Do athletes report feeling sad or hopeless for more than two weeks in a row more often than non athletes?
  - b. Have athletes or non athletes seriously considered attempting suicide more often?
  - c. Do the majority of those individuals who answered yes to the previous questions also report having disordered eating habits?



## CHAPTER 2

### METHODOLOGY

#### *Population and Sample*

The population sample will come from those who chose and were given parental consent to respond to the 2007 Youth Risk Behavior Survey (YRBS) that was established through the Center for Disease Control as part of their Youth Risk Surveillance System. This was a national survey given to high school students that was concerned with identifying risky behaviors and experiences. It is assumed that the participants come from a wide variety of ethnic, cultural, economic, and educational backgrounds. The survey is expected to be representative of adolescent American students in grades nine through twelve because the sample was stratified and weighted<sup>1</sup>. IRB consent is not needed due to the analysis being done with a secondary database.

#### *Design*

The study is a retrospective cross-sectional design and data files were downloaded through the Center for Disease Control's website and were analyzed using the Statistical Package for Social Sciences (SPSS 17.0) for complex samples.

#### *Data and Instrumentation*

The data being used is from the 2007 administration of the YRBS for high school adolescents in the United States. The CDC has reported that the validity of the YRBS instrument self-reported data is consistent with other similar data, and testing of the anthropometric data may indicate a slight overrepresentation of height and underrepresentation of weight, indicating a slight underestimate of overweight individuals with calculated BMI<sup>1</sup>. Results of test-retest reliability indicate relatively high stability of the instrument questions ( $\kappa = .61 - 1.00$ ).

Using the YRBS data acquired the responses to the following survey questions were exported, reviewed, and utilized for analysis:

(Q1) How old are you?

(Q2) What is your sex?

- (Q6) How tall are you without your shoes on?
- (Q7) How much do you weigh without your shoes on?
- (Q23) During the past 12 months, did you ever feel so sad or hopeless almost every day for two weeks or more in a row that you stopped doing some usual activities?
- (Q24) During the past 12 months, did you ever seriously consider attempting suicide?
- (Q65) How do you describe your weight?
- (Q66) Which of the following are you trying to do about your weight?
- (Q67) During the past 30 days, did you exercise to lose weight or to keep from gaining weight?
- (Q68) During the past 30 days, did you eat less food, fewer calories, of foods low in fat to lose weight or to keep from gaining weight?
- (Q69) During the past 30 days, did you go without eating for 24 hours or more (also called fasting) to lose weight or to keep from gaining weight?
- (Q70) During the past 30 days, did you take any diet pills, powders, or liquids without a doctor's advice to lose weight or to keep from gaining weight? (Do not include meal replacement products such as Slim Fast.)
- (Q71) During the past 30 days, did you vomit or take laxatives to lose weight or to keep from gaining weight?
- (Q84) During the past 12 months, on how many sports teams did you play? (Include any teams run by your school or community groups.)

The responses to these questions are used to obtain the needed information. In order to classify the participants as athletes or non athletes, question eighty four was used and those who played on zero teams were categorized as non athletes and those on one or more were considered athletes. Questions one, two, six and seven were used to calculate the BMI of participants. The participants were placed into BMI weight categories utilizing age-appropriate weight percentiles. Participant's body perception was based on their responses to question sixty-five. Disordered eating behaviors were studied using the responses to questions sixty-six through seventy-one. Gender comparisons were made using question two

and mental status (depression) was based on questions twenty-three and twenty-four. Descriptive statistics were used to describe the sample and answer the research questions.

## CHAPTER 3

### RESULTS

#### *Results*

Analysis was done for this study using the 2007 Youth Risk Behavior Survey (YRBS) data that had been weighted to ensure that there was not an over or underrepresentation of specific populations within the sample. Question eighty-four was re-coded to include those students that participated in one or more sports during the past year as “athletes” and those who had not participated in any sports as “non athletes”. It was found that 56.3% of the participants were qualified as athletes and 43.7% were non athletes. Of the sample population 49.5% were female and 50.5% were male.

Question 1a: Is there a difference between disordered eating habits of high school athletes versus non athletes? Do athletes report participating in any of the following more often than non athletes to attempt to lose or maintain the same weight: weight management intentions, increasing exercise habits, restricting caloric intake, fasting for more than twenty-four hours, taking diet pills/powders/liquids, vomiting or using laxatives?

The data indicated that of the non athletes, 50.2% were trying to lose weight; 17.8% were trying to stay the same weight; 12.6% were trying to gain weight; and 19.1% were not trying to do anything about their weight. Of the athletes, 41.4% were trying to lose weight, 21.7% were trying to stay the same weight; 19.2% were trying to gain weight; and 17.3% were not trying to do anything about their weight. Fifty-five percent of non athletes and 64.8% of athletes reported exercising in the past thirty days to keep from gaining weight or to lose weight. Forty-two and a half percent of non athletes and 38.7% of athletes responded that they had eaten less food, fewer calories, or foods lower in fat to keep from gaining weight or to lose weight. Fasting was described as not eating for twenty-four or more hours to lose weight or maintain weight. A little less than thirteen percent of non athletes and 10% of athletes reported utilizing

this weight management technique. Six percent of non athletes and five percent of athletes took some sort of diet pill, powder, or liquid to maintain or lose weight. Self-induced vomiting or laxative use was reported by 4.5% of non athletes and 3.9% of athletes as a way to lose weight or maintain their current weight. These results show that athletes report that they are attempting to either maintain weight or gain weight more often than non athletes. Exercising to lose weight or maintain weight was the only weight management technique reported as being used more often than non athletes.

Reported Weight Management Techniques		
	Non Athlete	Athlete
<b>Weight Management Intentions</b>		
Lose weight	50.2%	41.4%
Gain weight	12.6%	19.2%
Stay the same weight	17.8%	21.7%
Not trying to do anything	19.1%	17.3%
<b>Behaviors Used to Lose or Maintain Weight</b>		
Increasing Exercise	55.1%	64.8%
Eat Less, Fewer Calories, Lower Fat	42.5%	38.7%
Fast for More than Twenty-Four Hours	12.8%	10.0%
Take Diet Pill, Powder, Liquid	6.0%	5.1%
Self-Induced Vomiting or Laxative Use	4.5%	3.9%

Question 1b: In comparison to their calculated Body Mass Index (BMI), do athletes have an inaccurate body perception more often than non athletes?

Out of the non athletes that are calculated to be underweight about half perceive themselves to be underweight. Almost sixty-eight percent of normal weight non athletes believe that they are about the right weight and 60.2% of overweight non athletes perceive themselves to be slightly overweight. Finally, 25.9% of non athletes who are categorized as obese also see themselves to be very overweight. These percentages account for the accurate body perceptions of non athletes. The reverse of this is the number of non athletes that have an inaccurate body perception. Fifty-one percent of underweight, 32%

of normal weight, 38.7% of overweight, and 73.6% of obese non athletes believe that they are in a different weight category than their actual BMI indicates. When looking at the athletes, 57.6% of those individuals who are categorized as underweight accurately perceive themselves to be underweight. Seventy-one percent of normal weight athletes correctly categorize themselves as about the right weight. Forty-four percent of overweight athletes reported that they thought they were slightly overweight. Additionally, 16.5% of obese athletes believe that they are very overweight. When looking at inaccurate body perception, 42.4% of underweight, 28.6% of normal body weight, 55.5% of overweight, and 83.1% of obese athletes consider themselves to be in a different weight category than where they are accurately placed based on their BMI. These results show that non athletes that are either underweight or of normal weight have an inaccurate body perception more often than athletes who are underweight or normal weight. However, athletes who are overweight or obese have higher percentages of inaccurate body perception than non athletes who are overweight or obese.

**Comparison of Perceived and Actual Body Weight Status in Athletes and Non Athletes**

	Perceived weight status	Actual Weight Status			
		Underweight	Normal weight	Overweight	Obese
<b>Non Athlete</b>	Underweight	48.9%	15.0%	2.2%	2.9%
	About the right weight	49.6%	67.8%	32.6%	10.6%
	Slightly overweight	1.5%	16.2%	60.2%	60.1%
	Very overweight	.0%	.8%	3.9%	25.9%
<b>Athlete</b>	Underweight	57.6%	16.0%	1.3%	2.9%
	About the right weight	42.4%	71.0%	50.9%	19.1%
	Slightly overweight	.0%	11.9%	44.4%	61.1%
	Very overweight	.0%	.7%	3.3%	16.5%

Accurate Body Perception
Perceive More Overweight than Actual
Perceive More Underweight than Actual

Question 1c: Do athletes have a higher percent of individuals classified as being underweight according to their BMI calculation versus non athletes?

Of those individuals included in this study, 1.6% of those classified as athletes were also placed in the underweight category. 2.5% of those that are non athletes are considered underweight. These results show that of those who participated in this study, the non athletes had a higher classification rate as being underweight. Of the athletes, 72.1% of them were placed in the normal weight category. This was the only BMI classification that athletes had a higher percentage rate in than those who were non athletes.

Body Mass Index Categorization of Non Athletes and Athletes			
		Non Athlete	Athlete
BMI Category	Underweight	2.5%	1.6%
	Normal weight	65.3%	72.1%
	Overweight	16.4%	15.4%
	Obese	15.8%	10.8%

In response to the main question of whether or not there was a difference in disordered eating habits between athletes and non athletes, the results indicate that both athletes and non athletes follow the same pattern in percentages. Both athletes and non athletes had the highest percentage of individuals in the normal weight category and the lowest in the underweight category. The highest percentage of accurate body perception of both athletes and non athletes occurred in those individuals who were of normal weight according to their BMI and perceived themselves as about the right weight. Additionally, both athletes and non athletes reported the same relative usage of weight management techniques in the same order from highest to lowest percent. These were in the order of exercise, calorie/food intake decrease, fasting, diet pills/powders/liquids, and then vomiting or laxative use. There were some differences that are detailed in the discussion section.

Question 2: Do male or female athletes report utilizing the above weight management techniques more often?

Female athletes reported using all the weight management techniques more often than the male athletes. Of those female participants that were categorized as athletes 74.3% reported using exercise as a means to lose or maintain their weight. Fifty-four percent reported decreasing their amount of calories, food, or fat content. Fifteen percent of female athletes fasted for more than twenty-four hours, 6.1% took diet pills/powders/liquids within the past thirty days, and 6.0% vomited or used laxatives to lose or maintain their body weight. Out of those participants that were male athletes, 57.2% reported using exercise as a weight management technique, 26.4% reported decreasing their calories/food intake/fat content, 6.1% fasted, 4.4% took diet pills/powders/liquids, and 2.2% vomited or used laxatives to maintain their weight or lose weight.

Weight Management Techniques of Male and Female Athletes and Non Athletes			
		Non Athlete	Athlete
<b>Female</b>	Increasing Exercise	58.8%	74.3%
	Eat Less, Fewer Calories, Less Fat	51.7%	54.2%
	Fast for More than Twenty-Four Hours	16.5%	14.9%
	Take Diet Pill, Powder, Liquid	8.2%	6.1%
	Self-Induced Vomiting or Laxative Use	6.5%	6.0%
<b>Male</b>	Increasing Exercise	50.3%	57.2%
	Eat Less, Fewer Calories, Less Fat	30.6%	26.4%
	Fast for More than Twenty-Four Hours	7.9%	6.1%
	Take Diet Pill, Powder, Liquid	3.1%	4.4%
	Self-Induced Vomiting or Laxative Use	1.8%	2.2%

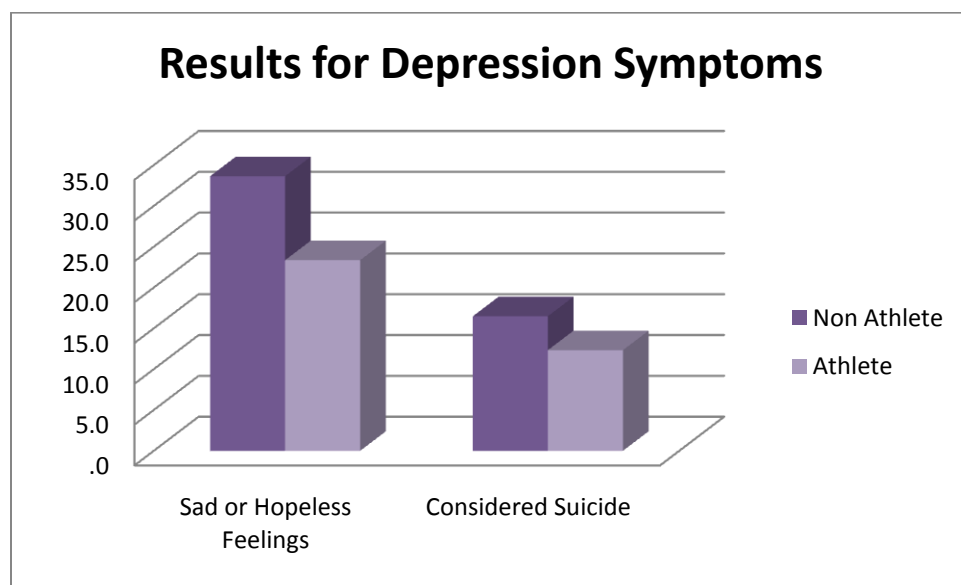
Question 3a: Do athletes versus non athletes have a higher depression rate and is this correlated with reported disordered eating behaviors? Do athletes report feeling sad or hopeless for more than two weeks in a row more often than non athletes?

In order address whether or not athletes might have a higher depression rate, questions regarding extended feelings of sadness or hopelessness and suicidal considerations were utilized due to the fact that a question directly assessing depression was not included in this survey. The results showed that 33.6%

of non athletes report feeling sad or hopeless for more than two weeks in a row and 23.4% on athletes report feeling this way. These were described as feelings that had taken place in the past twelve months and were severe enough to stop the individual from doing some of their usual activities.

Question 3b: Have athletes or non athletes seriously considered attempting suicide more often?

According to the survey, 16.5% of non athletes and 12.3% of athletes have seriously considered attempting suicide at some point during the past twelve months. The percentage of non athletes who report these behaviors are higher than athletes for both feelings of hopelessness and suicide consideration. This indicates that non athletes have higher indications of depression signs and symptoms, and therefore more likely higher depression rates within this sample population.



Question 3c: Do the majority of those individuals who answered yes to the previous questions also report having disordered eating habits?

Of those non athletes who reported either feeling sad or hopeless for more than two weeks or had considered suicide, 57.2% are trying to lose weight and 53.1% of athletes who reported the same feelings or thoughts are trying to lose weight. Of the non athletes who reported these depression tendencies, 58.5% are increasing exercise to manage weight, 50.9% are eating less, 22.9% fasted for more than



twenty-four hours, 9.8% have used a dietary supplement, and 9.6% have either vomited or utilized laxatives to lose weight. Of the athletes who reported feeling hopeless or considered suicide, 70.4% exercise, 49% decrease food intake, 21.1% have fasted, 9.9% have utilized diet supplements, and 9.5% have self-induced vomited or used laxatives in an effort to lose weight. In comparison to those athletes and non athletes who did not report feeling sad/hopelessness or had no past consideration of suicide, those individuals who did report these feelings or considerations had a higher percentage for reporting intentions to lose weight. Of those non athletes and athletes who reported neither of these behaviors, a higher percent were trying to stay the same weight or were not trying to do anything about their weight versus those individuals who could potentially be considered depressed. Those individuals who reported these depression-like tendencies also reported a higher frequency of utilization of all of the weight management techniques questioned in this survey. These results are summarized in the following chart.

#### Weight Management Intentions and Techniques of Athletes and Non Athletes Who Report Depression Symptoms

	NON ATHLETES		ATHLETES	
<i><b>WEIGHT MANAGEMENT INTENTIONS</b></i>	<b>Hopeless or Suicide Consideration</b>	<b>Neither</b>	<b>Hopeless or Suicide Consideration</b>	<b>Neither</b>
<b>Lose Weight</b>	57.2%	45.8%	53.1%	37.0%
<b>Gain Weight</b>	12.8%	12.4%	16.2%	20.3%
<b>Stay the Same Weight</b>	14.5%	19.9%	17.9%	23.2%
<b>Not Trying to do Anything</b>	14.9%	21.6%	12.3%	19.3%
<i><b>WEIGHT MANAGEMENT TECHNIQUES</b></i>				
<b>Increasing Exercise</b>	58.5%	53.2%	70.4%	62.6%
<b>Eat Less, Fewer Calories, Less Fat</b>	50.9%	37.5%	49.0%	34.9%
<b>Fast for More than Twenty-Four Hours</b>	22.9%	6.7%	21.1%	5.7%
<b>Take Diet Pill, Powder Liquid</b>	9.8%	3.6%	9.9%	3.3%
<b>Self-Induced Vomiting or Laxative Use</b>	9.6%	1.4%	9.5%	1.8%

#### *Discussion*

This study was able to analyze a national dataset in order to determine whether high school athletes had higher rates of disordered eating habits which could potentially lead to the further development of an eating disorder as their athletic career continued or finished after high school. As

discussed in the literature review, weight management can have positive health effects for developing adolescents by preventing an excess amount of body fat and multiple disease conditions<sup>1</sup>. However, there is a line between healthy lifestyle choices and more extreme techniques used to aid in weight loss or preventing weight gain. Because of this, it becomes hard to determine whether some of the reported behaviors of those who participated in this survey are an attempt to maintain a healthy lifestyle or could be considered a disordered eating habit. All of the weight management techniques that were surveyed were categorized as being used with the intention to aid in weight loss. These included exercising; eating less/fewer calories/less fat; fasting for more than twenty-four hours; using diet pill/powders/liquids; and vomiting or laxative use. Actual Body Mass Index categories were compared to the perceived body weight status of the individuals in order to gain a better understanding of how the participants viewed themselves and their body weight. The perceptions and behaviors of those surveyed were also separated according to sex in an attempt to gain a better understanding of how weight management behaviors can vary between males and females due to different pressures and ideals. Finally, characteristics relevant to depression were analyzed in order to determine potential effects of athletic participation on the mental state of adolescents.

When trying to determine if there is a difference between disordered eating habits in athletes and non athletes, this study looked at weight management intentions, weight management behaviors, perceived and actual weight status comparisons, and basic BMI category placement. It was found that about 50% of non athletes and only 41% athletes were trying to lose weight at the time they were surveyed. The only higher reported weight management behavior by athletes was utilizing exercise to lose weight. However, non athletes reported diet manipulation, fasting, diet supplement usage, and vomiting/laxative use all more often than athletes. Previous findings indicate that athletes who are suffering from eating disorders typically engage in excessive amount of exercise, fasting, and diet pills<sup>8</sup>. The athletes that participated in the YRBS survey and were analyzed in this study do not report these same tendencies other than an increase in exercise to manage their weight. These percentages further indicate that when collectively looking at all of the athletes surveyed, they have lower reported disordered

eating habits than non athletes. This can be based on the finding that athletes do not report using extreme forms of weight management (diet pills, fasting, vomiting, etc.) more often than non athletes and the similarity between the percentage results imply that athletic participation is not necessarily associated with the usage of these behaviors.

After reviewing the perceived versus actual weight status of both athletes and non athletes, it is found that athletes have a higher percentage of accurate body perception than non athletes when they are either underweight or normal weight categories; however, they have lower rates of accuracy when they are overweight or obese. It was found that almost 70% of athletes that are either overweight or obese believe that they are actually about the right weight, which raises concern for potential health risks for these individuals. Only about 43% of non athletes demonstrate these same results. This could indicate that athletic participation in sports that push for an increase in size and weight may be detrimental to the individual's health currently and in the future when they may no longer be participating in competitive sports. On the opposite end, underweight and normal weight athletes have slight higher rates of accuracy and no athletes that are underweight view themselves as overweight which is a positive finding, especially when compared to the 1.5% of underweight non athletes who do view themselves as overweight. Distorted body image like this is a risk factor that could lead to potential disordered eating habits and/or full eating disorders<sup>8</sup>. Even though about 42% of underweight athletes view themselves as about the right weight, this is still lower than the almost 50% of non athletes with the same perception. This indicates that athletic participation does not necessarily increase the tendency to think that a lower body weight is normal, but instead it is more likely a result of social pressures and norms. When looking at the BMI categories of athletes versus non athletes, the potential benefits of athletic participation are implied by the fact that a higher percentage of athletes fall in the normal category than non athletes and athletes also have a lower percentage of individuals that are underweight, overweight, and obese. Athletes and non athletes both follow the same trend of decreasing percentages from the normal to overweight to obese to underweight categories.

The next portion of this study analyzed the differences between male and female athletes and their use of these weight management behaviors and perceptions. A higher percentage of female athletes reported using all of the weight management techniques more often than male athletes. It was found that about 74% of female athletes report using exercise to lose weight and 54% restricted food or calorie intake. Both of these are much higher than the proportion of male athletes who reported using these same techniques, which was 57% exercised and 36% performed diet modifications. Male athletes reported utilizing more extreme diet measures more often than male non athletes, specifically diet pills/powders/liquids and self-induced vomiting or laxative use. Diet and exercise were the most common methods used by male and female athletes and non athletes, which may or may not be considered “disordered eating habits” but instead could just be regarded as contributions to a healthy lifestyle. However, generally speaking it seems that gender rather than athletic participation has a greater influence on the utilization of weight management behaviors. Female athletes and non athletes both had higher reports of losing weight through these methods than male athletes or non athletes. When looking further into the perceptions of females and males it becomes possible to see how weight issues affect genders differently, especially when athleticism is a factor. Half of underweight female athletes consider themselves to be about the right weight; however, only 37% of underweight male athletes consider themselves normal. Furthermore, 19% of normal weight female athletes consider themselves to be slightly overweight and only 5% of normal weight male athletes consider themselves overweight. Conversely, 23% of obese and 64% of overweight male athletes consider themselves normal versus only 8.5% of obese and 29% of overweight female athletes that consider themselves normal. These findings indicate that generally speaking female athletes are more likely to consider themselves to be overweight and male athletes tend to think that they are underweight. When comparing these percentages to female and male non athletes, the percentages of the female athletes are very comparable to the percentages of the female non athletes. However, when looking at the male athletes and non athletes, the non athletes tend to have a more accurate body perception when they are overweight. This is demonstrated by the findings that 23% of obese male athletes and 64% of overweight male athletes consider themselves

normal, in comparison to the 12% of obese and 42% of overweight male non athletes that consider themselves to be about the right weight. The results for both genders could be influenced by the thinking that “bigger is better” in some male dominant sports and that a lower body mass is more attractive or beneficial to performance in some of the female dominated sports. Both ends of the spectrum could be detrimental to long term weight management issues and other health concerns by not being able to accurately perceive one’s body weight status. This is evidence of weight issues manifesting themselves in males and females differently. This is further seen by the finding that 59.4% of female athletes are trying to lose weight and only 5% are trying to gain weight, but only 27% males athletes are trying to lose weight and 31% are trying to gain weight. Not only do these results demonstrate that there is a difference between the weight management behaviors of males and females, but also that female athletes tend to want to lose weight and males are trying to gain weight. When doing an analysis such as this one which includes both of these opposite ends in the same “athlete” category the results might seem more typical than they might be if the study was sport specific for example. These findings help to broaden the definition and recognition of eating disorders. Typically, eating disorders are thought to affect females more often<sup>5</sup>. Even though these results indicate that females report a desire to lose weight more often and their weight management techniques would align with the most common forms of eating disorders, it was also found that males may suffer from different types of disordered eating habits. This would mainly include tendencies to maintain a higher body weight or fat composition that could lead to future unhealthy habits that prevent male athletes from maintaining and managing a proper weight. This also aligns with the finding that when reporting on eating disorders, males revealed more bingeing behaviors and females discussed purging habits<sup>2</sup>.

***Male and Female Athlete and Non Athletes BMI Category versus Perceived Body Weight***

	Body Mass Index Category			
	Underweight	Normal Weight	Overweight	Obese
Perceived Body Weight Status				

<b>Non Athlete</b>	<b>Female</b>	<b>Underweight</b>	49.1%	10.9%	1.7%	4.1%
		<b>About the right weight</b>	50.9%	66.7%	26.5%	8.7%
		<b>Slightly overweight</b>	.0%	21.3%	66.5%	55.5%
		<b>Very overweight</b>	.0%	1.1%	4.7%	31.6%
	<b>Male</b>	<b>Underweight</b>	48.8%	20.7%	3.1%	2.0%
		<b>About the right weight</b>	48.8%	69.3%	41.8%	12.3%
		<b>Slightly overweight</b>	2.4%	9.2%	51.0%	63.9%
		<b>Very overweight</b>	.0%	.5%	2.5%	21.1%
<b>Athlete</b>	<b>Female</b>	<b>Underweight</b>	50.0%	10.6%	.7%	3.0%
		<b>About the right weight</b>	50.0%	69.1%	28.8%	8.5%
		<b>Slightly overweight</b>	.0%	19.0%	64.4%	59.2%
		<b>Very overweight</b>	.0%	.8%	5.8%	29.4%
	<b>Male</b>	<b>Underweight</b>	62.8%	21.2%	1.7%	3.1%
		<b>About the right weight</b>	37.1%	72.9%	63.8%	22.9%
		<b>Slightly overweight</b>	.0%	5.2%	32.5%	61.5%
		<b>Very overweight</b>	.0%	.7%	2.0%	12.0%

The final portion of this study analyzed whether or not athletes had higher reports of depression-like symptoms. Athletes reported feeling sad or hopeless and consideration of suicide in the past twelve months less often than non athletes. These findings are consistent with studies that suggest that athletes are better able to demonstrate skills that contribute to higher self-esteem and overall well-being<sup>7</sup>. When utilizing this information and incorporating it with the weight management intentions and behaviors, it can be suggested that these tendencies co-exist to a greater degree with depression rather than athletic participation. Furthermore, athletic participation may serve as a slight protective barrier for depression when taking into consideration that reports of these depression symptoms were about 30% lower in athletes than non athletes. Non athletes with depression tendencies had the highest reporting of weight lose intentions, followed by athletes with these tendencies, then non athletes without, and finally athletes without. Those non athletes or athletes that had reported sad/hopeless feelings or had considered suicide had higher reports of all weight management behaviors than those individuals who answered no to these questions, regardless of athletic status. The most substantial results were shown by the difference between the extreme weight management techniques used by those individuals who had reported

depression risk factors. Twenty-three percent of non athletes and 21% of athletes with these depression warning signs had also reported fasting for more than twenty-four hours versus 7% of non athletes and 6% of athletes with neither of these depression signs. About 10% of athletes and non athletes who had hopelessness or suicide consideration had taken diet pills/powders/liquids and 10% had utilized self-induced vomiting or laxatives to lose weight. These findings are much higher than the 3-4% of athletes and non athletes without depression who had utilized a supplement and the 1-2% that had vomited or used laxatives. These results indicate that those individuals with depression-like signs are more likely to use the more extreme techniques of weight management whether or not they are an athlete.

### ***Limitations***

The results of this study are limited by several factors. The category of “athlete” used throughout the analysis was no more specific than answering “yes” to participating in one to three or more sports. One of the ideas behind this study was to look at a large amount and wide variety of athletes in order to potentially detect a higher presence of disordered eating habits. Utilizing the YRBS database to determine if these risk factors were present allowed for this to be done; however, some of the numbers may have turned out more typical than expected due to the mixing of all kinds of athletes. For instance when looking at the tendency to attempt at losing weight for female athletes and gaining weight for males, these two opposites might balance each other out when looking at some of the final outcomes. In addition to combining the diverse habits of male and female athletes, combining athletes in weight dependent sports that focus on leanness (i.e. distance running, gymnastics, or wrestling) with athletes in sports that depend on large mass (i.e. football, basketball, or rugby) could also counterbalance each other in some of the results. The workout tendencies, body perceptions, social norms, and expectations of various athletes can differ dramatically which would impact their responses to the survey and the results. In addition, those athletes that only minimally participated on one recreational sport team for a short amount of time were combined with those three sport varsity athletes that are highly dedicated to performance year round. This gamete of athletes were all placed together for analysis and the level of commitment to one or more sports can also impact lifestyle factors that would influence the response to these questions. It should also

be considered when analyzing questions that rely on the Body Mass Index calculation that some reports indicate a potential bias based on the fact that muscle weighs more than fat and athletes typically contain more muscle. This might increase their BMI and place them in a higher category than they should be. Even though the survey was done anonymously, there is always the possibility that students did not answer truthfully and the volunteer nature of the survey has the potential to cause a small response bias. These both could also serve as limitations of the study.

### ***Application to Practice***

This study set out to determine if targeting athletes for eating disorder prevention interventions would be appropriate based on whether or not they were more prone to disordered eating habits. Since this specific study did not find that high school athletes were at any higher of a risk for developing eating disorders, it would not be necessary to specifically target athletes. However, the study did show that certain high school students do have weight management tendencies that could lead to eating disorders. It could be beneficial to target female high school students in general about how to manage weight in a healthy manner. This study also is helpful in revealing issues that may affect high school athletes when transitioning from high school sports to no longer competing. Specifically, it might be helpful to teach male athletes about proper nutrition amounts and content when they no longer have a need to gain weight for performance in order to prevent overweight or obesity issues. Additionally, female athletes who are trying to lose weight or utilize exercise to manage weight might need information on how to handle potential weight gain that may result from a decrease in activity levels. For future research possibilities it would be beneficial to still study large numbers of athletes, but also include further information on the specific sports, training and intensity levels, and individual commitment.

### ***Conclusion***

The results of this study indicate that athletic participation does not increase the tendencies toward disordered eating habits. The most common weight management techniques that are used by athletes are exercise and diet modification through a decrease in food, calorie, or fat intake. These can be argued to be part of a healthy lifestyle. Although certain percentages of athletes do report utilizing the



more extreme weight management techniques, they are less than those percentages of non athletes and their results follow the same patterns and trends. Athletes tend to have a higher accuracy of body perception and a higher percentage of them are classified as having a normal body weight. There are results that would indicate the presence of disordered eating habits that could lead to the development of an eating disorder; however, the numbers are very similar to their non athlete counterparts and might be more indicative of the age group rather than the athletic participants. There are results that indicate significant differences between the way athletic participation influences weight management between males and females. Female athletes tend to be more inclined than male athletes to utilize food intake restriction and fasting in addition to exercise to lose weight. Female athletes tend to be more focused on losing weight, while male athletes might be more focused on gaining weight. Finally, athletic participation seems to play no major role in increasing the likelihood of developing depression. In fact it may serve as a protective barrier and disordered eating habits might be better indicated by the presence of depression-like symptoms. Overall, this study does not raise any additional concern that athletic participation in high school could lead to eating disorders.

## **References**

1. Centers for Disease Control and Prevention. *2007 Youth Risk Behavior Survey*. Available at: [www.cdc.gov/yrbss](http://www.cdc.gov/yrbss). Accessed on 8-11-09.
2. Glazer JL. Eating Disorders Among Male Athletes. *Current Sports Medical Report*. 2008;7.6;332-337.
3. National Eating Disorder Association website. Available at: <http://www.nationaleatingdisorders.org>. Accessed on: 8-20-09.
4. Nichols JF (et.al.). Prevalence of the Female Athlete Triad Syndrome Among High School Athletes. *Pediatric Adolescent Medicine*. 2006;160;137-142.
5. Byrne S & McLean N. Eating Disorders in Athletes: A Review of the Literature. *Journal of Science and Medicine in Sport*. 2001;4.2;145-159.
6. National Federation of State High School Associations. *The Case for High School Activities*. Available at: [www.nfhs.org/web/2008/09/the\\_case\\_for\\_high\\_school\\_activit.aspx](http://www.nfhs.org/web/2008/09/the_case_for_high_school_activit.aspx).
7. Fulkerson JA (et.al). Eating-Disordered Behaviors and Personality Characteristics of High School Athletes and Nonathletes. *International Journal of Eating Disorders*. 1999;26;73-79.
8. Beals KA & Manore MM. Behavioral, Psychological, and Physical Characteristics of Female Athletes with Subclinical Eating Disorders. *International Journal of Sport Nutrition and Exercise Metabolism*. 2000;10;128-143.
9. Taub DE & Blinde EM. Eating Disorders Among Adolescent Female Athletes. *Adolescence*. 1992;27.8.
10. Stewart AD (et. al.). Body Image Perception, Satisfaction, and Somatotype in Male and Female Athletes and Nonathletes. *Journal of Sport Sciences*. 2003;21;815-823.
11. O'Dea JA & Abraham S. Improving the Body Image, Eating Attitudes, and Behaviors of Young Male and Female Adolescents. *International Journal of Eating Disorders*. 2000;28;43-57.